

Section 26 Aggregate Bases

4-2601 General

The contract defines the class of aggregate base to be used, the dimensions where it will be placed, and the specific unit of measurement. See Chapter 6, “Sampling and Testing,” of the *Construction Manual* for the requirements for sampling and testing aggregate base, including testing frequency.

4-2602 Before Work Begins

Before work begins, review the contract plans and specifications to determine requirements for aggregate base

The resident engineer should include the following steps in the preliminary review and inspections:

- If the contractor is to place the aggregate base on original ground, verify the design R-value by testing the basement material at the grading plane to ensure adequate thickness of the structural section. Complete testing early enough before the placement of the aggregate base to allow time for any needed redesign. (See Topic 604 in the *Highway Design Manual* for a discussion of R-value and structural section design.) Any necessary adjustments in thickness are usually made in the aggregate base.
- Test potential sources of aggregate base when the contractor requests the testing in writing. When Section 6-2.01, “General,” of the *Standard Specifications* requires charging the contractor for initial samples and tests, deduct applicable charges from contract payments.
- If reclaimed material is used for the aggregate base, ensure that the percentage of reclaimed material complies with contract requirements.
- Review compaction tests of the subgrade to receive aggregate base. Examine the subgrade to ensure that it has not deteriorated since it was tested. Be sure the material underlying the grading plane is still firm and stable. Isolated areas where pumping occurs require special attention.
- For specification compliance, measure the subgrade of the aggregate base. When measuring for compliance, spot-check areas between stations where stakes are set as well as at the staked locations. District personnel will determine the extent of this measurement, based on various factors such as the nature of the material, the efficiency of the contractor’s operation, and the accuracy of the grading operation (as indicated during the early stages of checking). For subgrade, the specifications specify tolerances above or below the grade established by the resident engineer. The grade will result from the control stakes placed by Caltrans forces.
- Give the contractor written permission if you decide the aggregate base may be dumped in piles and spread ahead to stabilize a cohesionless sand subgrade.

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- Determine if the contractor has complied with all requirements related to the use of local materials. See Section 6-2, “Local Materials,” of the *Standard Specifications* for details.

4-2603 During the Course of Work

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During work operations, the engineer should do the following:

- Sample the aggregate base at the time it is deposited on the roadbed. For requirements related to quality, perform the tests at the frequencies shown in Section 6-1, “Sampling Types and Frequencies,” of this manual. The frequency table has a provision for waiving the testing for R-value, but exercise caution when doing so. Previous tests must be current. For small amounts (under 500 tonnes), data from other projects or information from your district’s laboratory is normally sufficient. On larger projects, consider using at least one potential source or acceptance test as well as past experience on which to base your decision. Explain why you waived R-value testing in the project records.
- The contractor is not allowed to process material on the roadbed to make it comply with grading specifications. Therefore, before the aggregate base is deposited on the roadbed, the contractor must remove any oversized material and do any necessary blending.
- Compare sand equivalent and grading test results with requirements for operating range and contract compliance. See Section 3-608A, “Operating Range and Contract Compliance,” of this manual. Note that the volume of aggregate base represented by one test for contract compliance is less than that required for testing frequency. It is prudent to take frequent samples, especially with borderline test results, but test only on the frequency shown in the table in Section 6-1 of this manual. If a test result fails to meet the requirement for contract compliance, you may test additional previously taken samples, to determine the quantity of material represented by the failing test result.
- When aggregate base will be paid for by the ton, take sufficient moisture samples at the time of weighing to determine pay quantities accurately.
- Observe the spreading operation to ensure that it complies with the requirements. Note any wasting of material in the daily report. Be sure aggregate base is spread without significant segregation. You would normally perform this step through observation, but if problems persist, support your observations with a sieve analysis.
- If payment is by the ton, measure waste and deduct such quantities. Some material may be lost during any trimming, and district personnel will decide when the trimmings should be measured. In general, measure trimmings when the cost of such measurement does not exceed the anticipated deduction.
- Test the compaction of aggregate base layers. The testing frequencies shown in Section 6-1 of this manual indicate that testing will be necessary for control. District personnel will decide how much testing is necessary, based on the material’s uniformity and the particular operation. Generally, if the operation is uniform and well within specifications, you may decrease



testing frequency. Increase testing frequency for nonuniform operations with borderline results.

- Observe the compacting operation to ensure that the material forms a firm, stable base.
- Measure the surface of the finished aggregate base for conformance with tolerances specified in Section 26-1.05, “Compacting,” of the *Standard Specifications*. Control stakes set by Caltrans forces determine the planned elevation of the aggregate base surface. Require corrective action for any deficiencies. Measure the thickness of the completed aggregate base. Use your judgment to determine the number of measurements necessary. The minimum acceptable thickness equals the planned thickness minus the sum of the specified high tolerance on the aggregate base subgrade and low tolerance for the surface of aggregate base.
- The *Standard Specifications* allow the engineer to accept a deduction for deficient thickness in lieu of other corrective action. However, Caltrans policy is to ensure that thickness complies with requirements by ordering corrective action if thickness is deficient. Therefore, apply the deduction in only the most extenuating circumstances. Keep adequate records for payments on progress payment and final estimates. The type and frequency of measurement for your records will depend on measurement and payment clauses of the contract.
- Note in the daily report any inspections performed on items not otherwise part of a permanent record. For instance, you need not note any compaction tests taken, because they are recorded elsewhere. You do need to explain in the daily report any absence of testing. Also note that construction is performed in accordance with specified layer thicknesses, because this information is not recorded elsewhere.

4-2604 Measurement and Payment

When aggregate base is paid for by the ton, see the discussion of weighing and metering procedures in Section 3-9, “Measurement and Payment,” of this manual.

When aggregate base will be paid for by the cubic meter, begin making quantity calculations as early in the project as possible. Obtain quantity calculations from Project Development to determine if they are sufficiently detailed and accurate to be used in the project records.

4-2604 Measurement and Payment

